

Remarks

Amendments to the Claims

Claim 1 has been amended to focus on a tire with a component comprising 0.1 to 1.5 phr of zinc oxide particles having a mean diameter of less than 12 nanometers. Support for these features can be found in cancelled 2, 3, and 9, as well as on page 7, lines 8-10, of the specification.

Claim 7 is amended to include the limitations of cancelled claims 2, 3, and 9.

Method claims 11, 12 and 13 have been redrafted to improve clarity and have been amended in accordance with new claim 1.

Rejections Under 35 U.S.C. Section 103(a)

The claims have been rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. (English translation of CN 1368518 A) in view of Guo et al. (English translation of CN 1398923 A). To the extent that the amended claims are deemed unpatentable over these references, the rejections are traversed.

Wang et al. discloses a rubber composition for under-rail cushion. This rubber composition includes a “nanometer zinc oxide powder” which is described to be a powder of “spherical particles with average diameter of 20 to 40 μm ” (see page 9, lines 1-2, of the English translation), i.e. particles with a diameter of 20-40 microns. Wang et al teaches nothing else at all about the size of these particles, and the Figures 1 to 3 also provide no further details about the size of these “nanometer” zinc oxide particles. Furthermore, the rubber composition of Wang et al. comprises 2 to 10 shares (ie, parts) of zinc oxide (see Abstract). In contrast to amended claim 1, Wang et al. do

- (i) not teach to use their rubber composition in a tire, but explicitly refer only to rubber materials for under-rail cushion or other rubber anti-vibration products;
- (ii) not teach to use zinc oxide particles with a mean diameter of less than 12 nanometers, but to use so-called “nanometer zinc oxide powder” with particles in the 20 to 40 micrometer range; and
- (iii) do not teach to use 0.1 to 1.5 phr of zinc oxide particles but disclose the use of 2-10 phr zinc oxide.

Hence Applicants urge that Wang et al. is obviously materially deficient to teach or make obvious a tire as claimed in claim 1. The same argument applies to claims 4-7 and 19-23.

The disclosure of Guo et al. relates only to various manufacturing processes to make microfine zinc oxide particles having a particle diameter of less than 1 micron (1000 nanometer), which can be used in rubber, ceramic, textile and general chemical industry. Guo et al. also disclose that in case of particles having a diameter “at nanometer level of less than 100 nm”, quantum dimensional effects can be expected. However, there is no disclosure or suggestion in Guo et al. to

(i) use nanoscaled zinc oxide particles in a tire; or

(ii) use zinc oxide particles having a mean diameter of less than 12 nanometers in a tire, or

(iii) to add such nanoscaled zinc oxide in the specific and claimed amount of 0.1 to 1.5 phr to a rubber composition to be used in a tire.

Therefore, Applicants urge that Guo et al. is also materially deficient to disclose or to render obvious a tire as claimed in claim 1. The same applies to claims 4-7 and 19-23.

Furthermore, as to the obviousness rejection of the Examiner based on a combination of Wang et al. in view of Guo et al., a person skilled in the art and starting from the teaching of Wang et al. will learn from the disclosure in Guo et al. only that a reduction of the size of zinc oxide particles might lead to new effects and new chemical properties of the zinc oxide, but there is no reason given in Guo et al. why such a material should improve the properties of the under-rail cushion rubber of Wang et al.. Moreover, there is no suggestion in Guo et al. to reduce the size of the zinc oxide particles to less than 12 nanometer and, at the same time, to use the zinc oxide in an amount of 0.1 to 1.5 phr. Finally, neither Guo et al. nor Wang et al. mention the use of such special nanoscaled zinc oxide particles in tires. Applicants urge therefore that no motivation exists to combine the references, and consequently no prima facie obviousness exists.

Applicants urge that the Examiner's arguments are based on hindsight and are strongly influenced by the knowledge of Applicants invention. The Examiner is also reminded that an obviousness rejection under 35 U.S.C. 103 can only be established if each and every claimed feature is materialized in the cited prior art. This is not the case here for claims 1, 4-7 and 19-23 as argued.

With respect to method claim 11, it is pointed out firstly that neither Wang et al. nor Guo et al. disclose the presence of zinc oxide particles having a mean diameter of less than 12 nanometer in an amount of 0.1. to 1.5 phr in a rubber composition. Moreover, claim 11 clearly claims that the zinc oxide particles and the filler are mixed together separately from the rubber and are added to the rubber after mixing of zinc oxide and filler. Wang et al. however teaches to add the zinc oxide power directly to the rubber composition prepared there. There is no pre-mixing and joint addition of zinc oxide and filler to rubber as claimed. Guo et al. refer to the manufacture of microfine zinc oxide only. They give no information at all how such a zinc oxide power should be added to a rubber composition. In more detail, there is no pre-mixing and joint addition of zinc oxide and filler to a rubber as claimed. Hence, neither Wang et al. or Guo et al. nor their combination is able to anticipate Applicants' claim 11.

As to method claim 12, it is again pointed out firstly that neither Wang et al. nor Guo et al. disclose the presence of zinc oxide particles having a mean diameter of less than 12 nanometer in an amount of 0.1 to 1.5 phr in a rubber composition. Moreover, claim 12 clearly claims that the zinc oxide particles and a processing additive are mixed together firstly, and that this mixture is then added to a second mixture comprising the filler and a rubber. Wang et al. teach to add the zinc oxide power directly to the rubber composition prepared there. There is no pre-mixing and joint addition of zinc oxide and a processing additive to a second mixture comprising rubber and filler as claimed. Guo et al. refer to the manufacture of microfine zinc oxide only. Guo et al. give no information at all how such a zinc oxide power should be added to a rubber composition. Hence, neither Wang et al. or Guo et al. nor their combination is able to anticipate Applicants' claim 12.

With respect to method claim 13, it is at first again pointed out that neither Wang et al. nor Guo et al. disclose the presence of zinc oxide particles having a mean diameter of less than 12 nanometer in an amount of 0.1 to 1.5 phr in a rubber composition. Moreover, claim 12 clearly claims that a masterbatch comprising the zinc oxide particles and a polymer is prepared, and that this masterbatch is then added to a mixture comprising the filler and a rubber. Wang et al. teach to add the zinc oxide power directly to the rubber composition prepared there. There is no preparation of a

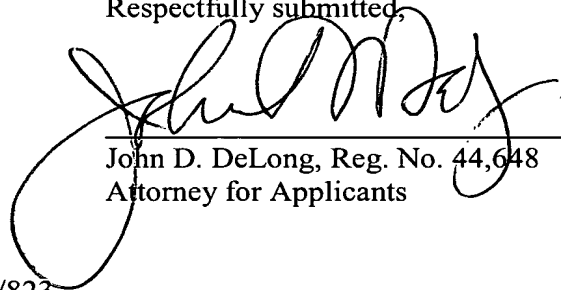
masterbatch comprised of a polymer and nanosclaed zinc oxide. Guo et al. refer to the manufacture of microfine zinc oxide only. They give no information at all how such a zinc oxide power should be added to a rubber composition. In particular, Guo et al. do not disclose the preparation of a masterbatch comprising nanoscaled zinc oxide particles and a polymer, and mixing said masterbatch with a mixture comprising the filler and a rubber. Hence, neither Wang et al. or Guo et al. nor their combination is able to anticipate Applicants' claim 13.

Applicants' claims 15 through 18 depend on one of claims 11, 12 or 13 and are therefore patentable for the same reasons as given above for claims 11, 12 and 13.

Conclusion

Applicants urge that the claims as amended are neither disclosed nor suggested by Wang et al. or Guo et al. nor their combination, and that these claims are therefore patentably distinct from this prior art. The Examiner is respectfully requested to reconsider the application in the light of the forgoing arguments and to remove his rejection and to allow now pending claims.

Respectfully submitted,



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